



Douglas A. Ducey  
Governor

# ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY



Misael Cabrera  
Director

## Inadequate Response to a Comprehensive Request for Additional Information

February 14, 2017

### *Via Electronic Mail*

Excelsior Mining Arizona, Inc.  
Attn: Roland Goodgame, Executive VP  
2999 N. 44<sup>th</sup> Street, Suite 300  
Phoenix, Arizona 85018

**Re: Gunnison Copper Project  
Individual Aquifer Protection Permit  
Inventory No. 511633, LTF No. 61397**

Dear Mr. Goodgame:

The Arizona Department of Environmental Quality received the above-referenced amendment application on January 13, 2016. The application was submitted in accordance with Arizona Administrative Code (A.A.C.) R18-9-A211(B) for an individual aquifer protection permit (APP). At this time, the application is in the Substantive Phase of the Licensing Timeframe (LTF) for this application.

ADEQ sent you a Comprehensive Request for Additional Information (CRAI) letter on June 17, 2016. Your response was received on September 1, 2016. After a review of your submittal, ADEQ has determined that your responses do not contain all of the required information. The following information is required to lift the suspension of the LTF for this application as per Arizona Revised Statutes (A.R.S.) § 41-1075.

ADEQ appreciates Excelsior's participation in weekly meetings held since January 20, 2017 to ensure that both Excelsior and ADEQ have a good understanding of the remaining information that is required. ADEQ looks forward to Excelsior's participation in weekly meetings in the upcoming weeks to work through the remaining outstanding items.

### **Review Summary**

Adequate information was provided for the following comments:

1, 3.b, 3.c, 4, 5.a, 5.b, 5.c, 6.a, 6.b, 7.a, 7.b, 10.a, 13.a, 13.b, 13.c, 14b, 17.c, 17.d, 18 (part 1), 21, 22, 24, 25.a, 25.b, 25.c, 25.d, 26, 27, 28, 30, 31, 32, 33, 34, 35, 37, 41, 44, Volume III, Appendix M opening comment, 47.a, 47.d, 47.e, 47.f, 48, 49, and 52.

Additional information is required for the following comments:

2, 3.a, 8.a, 9.a, 11, 12, 14.a, 15, 16, 17.a, 17.b, 17.e, 17.f, 18 (part 2), 18.a, 18.b, 20, 23, 29, 36, 38, 39, 40, 42, 43, 45, 46, 47, 47.b, 47.c, 47.g, 50, 51, 53, 54, and new comment 55.

ADEQ's evaluation of Excelsior's response to CRAI, and comments requesting additional information is provided below.

### **Required Information**

State law requires you to submit to ADEQ the following information to lift the suspension of the timeframe and continue processing of this application as per Arizona Revised Statutes (A.R.S.) § 41-1075:

#### **ADEQ Evaluation**

The response to RAI 2 is **not** adequate.

Excelsior plans to use the North Star Hydrology (NSH) wells as intermediate monitoring wells for the purposes of early detection. There appear to be gaps in NSH well coverage in the eastern portion of the site. Please provide a discussion on why intermediate wells are not needed in the eastern portion of the site per A.A.C. R18-9-A202(A)(5)(b).

During meetings between Excelsior and ADEQ on January 20, 2017 and Excelsior, ADEQ and the U.S. EPA on January 26, 2017, Excelsior presented geologic and structural cross-sections along with figures that showed the location of a particular well's aquifer test along with the observation wells that were used during the aquifer test. The figure showed the influence of both the faults and bedding planes. The figures also indicated proposed additional intermediate monitoring well locations.

Based upon the response and figures presented during the January 2017 meetings, please include the following:

- a. Include the mine blocks on the figure or figures to indicate how the NSH wells and other additionally proposed "intermediate wells" would relate to the various mine blocks.
- b. Indicate whether all NSH wells and other additionally proposed "intermediate wells" would be monitored during which or all phases of mining.
  - i. if they will not all be continuously monitored, when they will be monitored and provide their screen intervals.
- c. The figure(s) and cross-section(s) that show each aquifer test well with its associated observation wells, the interpreted responses and which mine blocks were evaluated.
- d. Figure(s) that provide the combined interpretive responses of all of the conducted aquifer tests along with the proposed locations of additional "intermediate wells".

- e. Please provide this information, if available, for each stage and if not available, propose compliance schedule items for those “intermediate wells” that would be used in Stage II and later in Stage III.

#### **ADEQ Evaluation**

The response to RAI 3a is **not** adequate.

Excelsior indicates that “The extent of petroleum in CS-10 and CS-14 appears to be limited to the immediate area of the boreholes and also indicated that when CS-10 and CS 14 were drilled (1971) it was common to add diesel or any other inexpensive hydrocarbon compounds to the drilling mud to lubricate drill rods. The wells nearest to these borings (NSH-13 and NSH-9, respectively) do not contain LNAPL.” In addition, dissolved petroleum compounds have been detected in NSH-15, NS-16 and NSH-17 immediately downgradient of the closed “The Thing” underground storage tank release. The detected petroleum compounds are less than their respective aquifer water quality standards (AWQS).

Excelsior must provide a brief description on whether NSH-13 and NSH-9 are constructed in a similar manner as CS-10 and CS-14.

#### **ADEQ Evaluation**

The response to RAI 8a is **not** adequate.

Excelsior explains that each model grid represents a 5-spot injection/recovery well pattern since the model grid in the ore body is 75 x 75 feet in size and is 300 x 300 feet in size outside the ore body. ADEQ understands the limitations on how the groundwater flow model works.

ADEQ has the following additional requests to help clarify the sequence of mining and to help clarify closure costs for each phase of mining.

- i. Figure 8-1 Updated Mining Block Sequence provides a color scheme for each mine block over 17 years. Some of the colors are very close to each other and are difficult to differentiate. ADEQ requests that the colors be better differentiated between the mine blocks so the sequence is clearer by having different types of hatching and/or other distinguishing mark added to the colors to help clarify mining sequence.
- ii. Figure 8-2 Particle Starting Location for Mining Year 5 includes years 2 through 5 but does not include year 1. Please provide a rationale as to why year 1 was not included in the particle tracking. In addition, ADEQ requests that particles for year 1 be allowed to run with only year 1 wells, then particles for year 5 be allowed to run with only year 1 through 5 wells which would include available hydraulic control wells. ADEQ also requests additional, similar type model runs for year 10 (mining years 6 to 10), particles added for those mine blocks added during those years and all hydraulic control wells that will be installed and operating at year 10 so closure costs

may be determined if there was a cessation of mining during or after Stage I is complete. ADEQ requests similar individual evaluations, if appropriate for Stage II and/or Stage III, or otherwise propose compliance schedule items for similar type modeling for Stage II and Stage III or Stage III.

**ADEQ Evaluation**

The response to RAI 9a is **not** adequate.

Figure 9-1 Revised Discharge Impact Area 23 Year Simulation shows discharge impact areas (DIA) that are not the same as the footprint of the lined impoundments. Please provide a discussion on why the DIA for the lined facilities are showing that there will be releases from those facilities per A.A.C. R18-9-A202(A)(5) and A.A.C. R18-9-A202(A)(8)(b)(xiii).

**ADEQ Evaluation**

The response to RAI 11 is **not** adequate.

Excelsior provided tables of net withdrawal rates, estimated average total pumping rate and estimated maximum pumping rate for the three stages of mining and post production rinsing. ADEQ requests an additional table that clarifies the net withdrawal rates, the estimated amount and rate of water injected and recovered from the mine blocks and the estimated amount and rate of water pumped from the hydraulic control wells.

**ADEQ Evaluation**

The response to RAI 12 is **not** adequate.

Sources of clean water include five potential sources: Johnson Camp Mine (JCM) Section 19 well (55-611610); Smith Well 1 and 2 (55-909280 and 55-911489); Smith Well #3 (55-911560); the Moore Shaft at JCM; and unimpacted water from hydraulic control wells. ADEQ requests that each potential source of clean water be represented on a figure containing the mine blocks. The volume of clean water that may be used from each source should also be provided with a discussion on whether the groundwater flow model included an evaluation of how this pumping may impact capture.

**ADEQ Evaluation**

The response to RAI 14a is **not** adequate.

The response indicated that the location of the hydraulic control wells was provided in Figure 2-1. This figure did not provide the locations of the hydraulic control wells, only the intermediate NSH monitoring wells. Please clarify the location of the hydraulic control wells and provide the approximate latitude and longitude for each hydraulic control well.

**ADEQ Evaluation**

The response to RAI 15 is not adequate.

Excelsior states the solids generated by the water treatment facility (WTF) will be located in a Solids Containment Impoundment which will be double lined facility with leak detection per BADCT. The response does not state what will happen to the brine generated by the reverse osmosis of the solution that is filtered and treated from the WTF. Please state the location of the brine storage per A.A.C. R18-9-A202(A)(3).

**ADEQ Evaluation**

The response to RAI 16 is not adequate.

While ADEQ accepts the proposed Alternative 1, ADEQ requests the following additional information.

ADEQ has the following comments on Alternative 1.

- a) In Section 7.1.4.2.1 Hydraulic Gradients, it is proposed to use paired observation wells located outside the hydraulic control wells. ADEQ requests that Gunnison evaluate additional lines of evidence to help demonstrate hydraulic control. For example, use of additional wells (intermediate wells), groundwater contour maps, and groundwater chemistry (electrical conductivity) to document hydraulic control. The data collected can be used to further calibrate and refine the numeric groundwater flow model.
- b) Section 7.1.4.2.2 Injection Flow includes the estimated average injection rate and estimated maximum injection rate in gallons per minute (gpm) for Stages 1, 2, and 3 along with post production rinsing. ADEQ requests that Excelsior provide an estimated average and maximum flow rate for each year as well as estimated total flow rates that will be included as a discharge limit within the permit if it is appropriate. If not appropriate, please provide a discussion on why a flow discharge limit is not appropriate for this permit.
- c) In the second paragraph of Section 7.1.4.3 Borehole Abandonment it is indicated that Excelsior may abandon some wells and core holes to control flow to the shallow bedrock of "PLS". Excelsior must provide a description with the criteria as to when a well and/or core hole would be abandoned to prevent migration.
- d) In the sixth paragraph of Section 7.1.5.1 Rinsing Strategy, it is indicated that only 10% of wells within the mining block during the rinsing process will have groundwater monitoring to evaluate effectiveness of rinsing. The list of analytes includes: dissolved metals, sulfate, TDS, pH, VOCs and specific conductivity. Excelsior must provide rationale on how many samples will be collected, including which wells would be sampled. ADEQ recommends a much higher percentage of

wells to be sampled or provide a description on why 10% is an appropriate number of wells to be sampled. For example, at February 2, 2017 meeting between Excelsior and ADEQ, Excelsior showed a figure with the 10% of wells represented and indicated that 10% of wells represents a sampling interval of one sample per acre. Based upon the previous sentence, please provide the figure and associated language. Excelsior must discuss how many wells for each mine year closure are to be sampled.

- e) In Section 7.1.6 Post-Closure Groundwater Monitoring, it is proposed to monitor the POC wells for an additional five years annually after rinsing is complete. Excelsior must provide a rationale as to why five years of post-closure monitoring at the POC wells is considered to be adequate. Excelsior must also define when post-closure monitoring is considered to begin. ADEQ recommends that post-closure monitoring to monitor for rebound truly begins once rinsing is complete. Excelsior must also indicate the time frame for post-closure monitoring within the rinsed mine blocks and state why that timeframe was chosen.
- f) Section 7.1.7 Feasibility and Practicability did not include any disadvantages. Excelsior must provide a description on why there are no disadvantages to their chosen alternative.

ADEQ has the following comments on Alternative 3.

- a) In Section 7.2.2 Operational Feasibility, it is indicated that the hydraulic control wells located near the active mine blocks would need to be abandoned as mining advances. This is not necessarily true. The nearby hydraulic control wells could be placed in locations that would allow the hydraulic control wells to be repurposed as injection/recovery wells for a mine block. Additionally, these hydraulic control wells would provide valuable hydrogeologic information to help with the configuration of future mine blocks. This discussion should be included in the evaluation.
- b) Section 7.4.4 Summary Table provides an evaluation of the following parameters: Degree of Aquifer Loading; Practicable and Economically Achievable; Demonstrable; Water Resource Conservation; Technical Advantages; and Technical Disadvantages. Under Degree of Aquifer Loading, the response states the reference BADCT alternative, Alternative 1, provides the lowest loading, due to all solutions being contained due to the hydraulic control wells. This is not entirely accurate. Alternative 1 provides the most dilution of any escapes from the mine blocks, not limiting loading. Excelsior must remember that the bedrock is a drinking water aquifer under A.R.S. § 49-202 and is the sole source of drinking water in the area. So any escape from the mine block should be considered aquifer loading and be evaluated as such. Based upon the comments provided above for Alternative 1 and Alternative 3, the summary table should be revised.

**ADEQ Evaluation**

The response to RAI 17a is **not** adequate.

Excelsior proposes to maintain approximately balanced injection and recovery rates within the mining block to prevent significant drawdown. A proposed permit condition is that the 30-day rolling average of total volume of injected fluids will not exceed the 30-day rolling average of total volume of recovered fluids (production plus hydraulic control pumping).

Additionally, if the 30-day rolling average of total volume of injected fluids will not exceed the 30-day rolling average of production plus hydraulic control pumping, the contingency plan would be implemented. Based upon the BADCT discussion above in RAI 16 Alternative 1, a, Excelsior should include the following potential ALs for flow: total injection in the mine block(s), total recovery in the mine block(s) and total extraction at the hydraulic control wells.

The section also includes establishing a demonstrable gradient at the well field boundary establishing BADCT. Excelsior also indicates that if an outward hydraulic gradient is measured for one week or more, an inward gradient would be re-established. Excelsior must describe why one week of not having demonstrated capture is an appropriate time to allow the system to continue operating.

**ADEQ Evaluation**

The response to RAI 17b is **not** adequate.

Excelsior proposes to establish AL for each observation well pair to maintain an inward gradient, and if an outward hydraulic gradient is measured continuously for more than one week, the inward gradient will be re-established by one or more measures discussed in the application.

As stated above in ADEQ Evaluation for RAI 17a, Excelsior must provide a rationale as to why ALs should not be included in the permit.

**ADEQ Evaluation**

The response to RAI 17e is **not** adequate.

As stated in ADEQ Evaluation for RAI 16, Alternative 1, a, ADEQ requests that additional lines of evidence be utilized to demonstrate capture including groundwater contour maps showing capture at the POC wells and to establish what is going on within the mine block.

Excelsior provided the same discussion as above to Part a. regarding losing hydraulic control for a week. Please see ADEQ Evaluation for RAI 17.a, pertaining to hydraulic control loss.

**ADEQ Evaluation**

The response to RAI 17f is **not** adequate.

“The cone of depression created by the hydraulic control wells will be monitored by measuring water levels with transducers at a frequency of once-per-day (or greater) at the observation well pairs. The observation well pairs on the east side of the wellfield are located inside the PMA but outside the wellfield boundary. Groundwater quality will be monitored at the PMA boundary in the proposed POC wells.”

As stated above in ADEQ Evaluation for RAI 17e, ADEQ requests additional lines of evidence ensuring capture is demonstrated.

**ADEQ Evaluation**

The response to RAI 18 (part 2) is **not** adequate.

The response included center points for each mine block in Figure 18-2. In addition, Excelsior provided a table, Table 18-1, that indicates how many injection/recovery, existing monitoring, hydraulic control, POC and observation wells. Based upon the table, it is indicated that 2 Observation wells will be installed in year 1 with three hydraulic control wells. However Excelsior’s response to RAI 16 Alternative 1 (page 7-6 of revised BADCT demonstration), indicated that two observation wells would be placed at each hydraulic control well. Based upon the table, there seems to be a contradiction, please clarify.

**ADEQ Evaluation**

The response to RAI 18a is **not** adequate.

Excelsior referred to Figure 18-2 and Table 18-2 which provides a list of all wells including northing and easting. However, ADEQ requests that the center point for each mine block be referenced in latitude and longitude.

**ADEQ Evaluation**

The response to RAI 18b is **not** adequate.

To the first part of the comment, Excelsior indicated that the hydraulic control well network creates a cone of depression which forms the barrier. Figures 60, 61, and 62 in Appendix I of the APP Application define the areas of capture.

To the second part of the comment, Excelsior indicated that hydraulic control will be demonstrated on a continuous bases at the observation wells; however, the PMA is located at the break in hydraulic gradient (i.e. the edge of the hydraulic barrier). Excelsior must indicate that hydraulic control will be demonstrated at the POC wells.



**ADEQ Evaluation**

The response to RAI 20 is **not** adequate.

Excelsior indicated that a water balance for the Stage 1 operations was submitted with the Gunnison APP application, and included the JCM process solution ponds.

Excelsior submitted an amendment application for the Johnson Camp Mine (JCM) permit in which they have provided a water balance for the ponds located at the JCM facility.

Regarding managing solutions as a contingency measure during pipeline repairs, Excelsior proposed to installation of a single-lined pond called the Pipeline Drain Pond. Based on the largest anticipated pipe having an outside diameter of 24 inches, the proposed capacity of the pond including design storm volume and two feet freeboard is 1.05 acre-feet. Drawing contained a plan sectional views of the impoundment. However, anchor trench details were missing. Please provide anchor trench details. Also, please clarify what the value of 3.65 used in the calculation of design storm volume represents.

**ADEQ Evaluation**

The response to RAI 23 is **not** adequate.

Excelsior indicated that they plan to retain the NSH monitoring wells to serve as intermediate monitoring wells, and plug and abandon wells/coreholes within the wellfield that will not be used as intermediate observation wells prior to injection operations. Prior to injection operations these borings will be left open since they may be used as observation wells during aquifer testing. Please see ADEQ Evaluation for RAI 16, Alternative 1, c on when a well and/or core hole would be abandoned. The abandonment procedure described in Excelsior's response to RAI 23 is adequate.

**ADEQ Evaluation**

The response to RAI 29, part 1 is **not** adequate.

Excelsior indicated "The quoted passage should not be construed to suggest that fluid levels in observation wells are in any way the cause of hydraulic control loss. The statement was intended to convey that fluid levels in the observation wells may indicate, but do not necessarily confirm that the hydraulic gradient toward the wellfield has been lost." "As discussed in response to comment 28, depending on the location of active mining, it could take months or years for a particle to exit the wellfield in the event of hydraulic control loss."

Excelsior does not propose to measure this gradient between injection and recovery wells because levels in pumping and injection wells do not accurately reflect levels in the aquifer. Instead, gradients will be measured at observation well pairs associated with the hydraulic control wells. The water level elevations in each pair will be compared to confirm that the inboard water level elevation is an established amount lower than that in the outboard well. Alarm conditions will notify the operators to implement corrective actions if the water level

elevation difference approaches an established alarm level. The actual amount will be established in the field during operations, and this can be addressed as a compliance schedule item.

The evaluation of the amount of time that is needed for excursions of PLS to travel from mine well blocks to the hydraulic control wells is presented above in ADEQ Evaluation to RAI 8.a.ii. In addition, as stated above in ADEQ Evaluation to RAI 16, Alternative 1, a, ADEQ requests Excelsior use multiple lines of evidence, i.e., potentiometric contour map, for establishment of capture per A.A.C. R18-9-A202(5)(b).

#### **ADEQ Evaluation**

The response to RAI 29, part 2 is **not** adequate.

Excelsior indicated that controls for the injection and recovery wells will be located in the Header House. With the exception of the pressure transducers for each production well, Excelsior will install the above mentioned controlled and monitoring devices. A transducer may be installed at the discretion of the operator in an individual well or group of wells if necessary.

Per A.A.C. R18-9-A205(A) and R18-9-A206(A), Excelsior shall include transducers for all injection, recovery, hydraulic control, intermediate monitoring (NSH wells), and observation wells in order to monitor groundwater elevations to ensure the cone of depression is being maintained at the PMA boundary.

#### **ADEQ Evaluation**

The response to RAI 36 is **not** adequate.

Rip rap along the toe of selected slopes were added to the revised drawings provided in response to Comment 38. Embankments higher than existing ground are not always necessary since pond edges along higher ground with small contributing watersheds have minor run-on potential. Run-on into ponds will be prevented by ditches, swales and berms.

Plant Runoff Pond design was revised (figure K-8 in response to Comment 38) to promote controlled inflow into the pond.

Excelsior included a document titled "Plant Site Drainage Analysis Summary" prepared by M3 Engineering dated August 29, 2016 on a CD. However, this document was not sealed by the engineer. Per A.R.S. § 32-101(B)(11), please re-submit the document prepared by M3 Engineering with the Arizona registered professional engineer's seal.

### ADEQ Evaluation

The response to RAI 38 is **not** adequate.

Excelsior had previously included an additional 20% volume to provide operational flexibility. Though the additional 20% volume was considered desirable, it was not specifically required. In place of the 20% additional volume, Excelsior provided the additional volume required for a 100-year, 24-hour storm event. Excelsior provided revised tables in the revised Appendix K provided in response to this comment.

The Evaporation Pond previously proposed for Stage 2 and 3 has been proposed to be used in Stage 1 and has been renamed as Evaporation Pond #1. In the future, Excelsior may add another evaporation pond (Evaporation Pond #2) under an amendment to the permit.

Revised drawings showing contours, v-ditches, and diversion ditches were provided in the revised Appendix K (these were not presented in the original Appendix K).

A mathematical error was identified for the Solids Impoundment (Table 5.1, page K-21) in which the Total Volume Required (ft<sup>3</sup>) was presented as 15,204,180, while the total of the Accumulated 60% Precipitate Slurry Volume (13,872,750), Design Storm Volume (217,800), and Two Feet Freeboard Volume (1,203,630) is 15,294,180 ft<sup>3</sup>. Please resubmit the revised calculations, or alternatively acknowledge typographical error.

### ADEQ Evaluation

The response to RAI 39 is **not** adequate.

Excelsior indicated that there are a total of four wells within 150 feet of the perimeter of the PLS Pond. Information related to the four wells was provided. However, the information does not match the ADWR records (well depth, casing depth, and casing diameter). See screenshots below.

Also, Excelsior did not state that they would abandon the wells found within 150 feet of the perimeter of the pond.

Please correct the information for the wells as per ADWR records, and indicate which wells, if any, are planned to be abandoned.

### Excelsior Response to Comment 39

ADWR Registry ID	CADASTRAL	Well Name	Owner	Well Type	Depth (ft)	Casing Depth (ft)	Casing Diameter (in)	Latitude	Longitude
224035	D(15-23) 31CAD	NSH-020	EXCELSIOR MINING CORP	ENV - MONITOR OR PIEZOMETER	1600	1582	4.5	32.08374886	-110.038526
224101	D(15-23) 31CAD		EXCELSIOR MINING CORP	ENV - MONITOR				32.08406809	-110.0387882
224100	D(15-23) 31CAD	NSH-018	EXCELSIOR MINING CORP	ENV - MONITOR OR PIEZOMETER	997	992	4.5	32.08419361	-110.0385209
917777	D(15-23) 31CDA	NSH-029	EXCELSIOR MINING CORP	ENV - MONITOR OR PIEZOMETER	710	709	2.375	32.08296473	-110.0385398

Data from Arizona Department of Water Resources Well Registry Database

### ADWR Website

Reg No	GWSI Site ID	Cadastral	Owner Name	Well Type	Well Depth (ft)	Casing Depth (ft)	Casing Dia (in)
17777		D15023031CDA	EXCELSIOR MINING CORP	MONITOR			
24101		D15023031CAD	EXCELSIOR MINING CORP	MONITOR			
24035		D15023031CAD	EXCELSIOR MINING CORP	MONITOR	710	700	7
24100		D15023031CAD	EXCELSIOR MINING CORP	MONITOR	997	960	4

### ADEQ Evaluation

The response to RAI 40 is not adequate.

Excelsior provided a QA/QC plan prepared by Paul Axelrod. The document was not sealed. This document shall be sealed by an Arizona registered professional engineer.

### ADEQ Evaluation

The response to RAI 42 is not adequate.

Wells will be plugged and abandoned after rinsing of a mine block is complete. There is no plan to wait until the end of Stage 1 to plug and abandon wells.

In general, wells that begin leaching operation a given year will be ready for abandonment in Year 8 (Four years of leaching, early stage rinsing in Year 5, one year rest period in Year 6, late stage rinsing in Year 7, and abandonment in Year 8). In some cases wells located adjacent to a mine block may not be immediately abandoned and instead may be used for observation purposes.

Excelsior must provide an evaluation of the mine plan to ensure no wells are abandoned prematurely and adjust closure costs as necessary. For example, based upon Figure 8-1, mining may be taking place upgradient of year 1 and other earlier years mining. While the year 1 mine location may have been rinsed, relaxed and rinsed again, potential "PLS" may become present again in the year 1 mine location.

### ADEQ Evaluation

The response to RAI 43 is not adequate.

Excelsior indicated that during the project life there will be 1,400 injection/recovery wells over 192 acres. The sampling of all wells is not reasonable due to the close spacing of the wells and due to the fact that many of the samples from injection wells would simply reflect collection of recently-injected clean rinse water.

Sampling of 10% wells equate to one well for every 1.4 acres. Excelsior considers this to be a high sample density that will adequately characterize the effectiveness of rinsing. Please see ADEQ Evaluation for response to RAI 16 Alternative 1, d.

**ADEQ Evaluation**

The response to RAI 45 is **not** adequate.

Excelsior indicated that they do not plan to rinse the basin fill since there will be no injection of solutions into the basin fill. Revised geologic cross-sections were provided in response to comment 26.

A bedrock ridge composed of limestone is present east of the wellfield. If groundwater is present in the basin fill, it will be neutralized as it flows through the limestone.

The revised Stage I Closure Costs were developed for 10 years using third party contractor costs. Closure costs for the Evaporation Pond #1 and Pipeline Drain Pond were also included. Costs included removal of mechanical evaporators, earthwork, dewatering, placement of geotextile for covering evaporation solids, rip-rap to protect surface drainages, and revegetation/reseeding of the pond surface after covering.

The closure costs took into account credits for closure work that would have been completed in a given year starting in Year 5. The maximum liability was identified in Year 8 in the amount of \$8.420 million.

Please include revised closure costs based upon comments to ADEQ's evaluation of RAI 8.a.ii.

**ADEQ Evaluation**

The response to RAI 46 is **not** adequate.

Excelsior provided a table of injection and recovery wells planned by each year for Stage 1. The table included well installed, closed and in rinse phase and indicated that Year 7 will have the maximum number of production wells comprised of injection and recovery wells.

Please see comments to ADEQ Evaluation of RAI 42.

**ADEQ Evaluation**

The response to RAI 47 (first subpart a) is **not** adequate.

Excelsior indicated that 200 wells are planned for Stage 1. The number of wells planned for closure in Year 10 is 48. The response states "no observation or hydraulic control wells are planned for closure in Stage 1 as they would be required in Stages 2 and 3; however, costs were included for closure of these wells (see Table M-1 in response to Comment 46).

Please see comments to ADEQ Evaluation of RAI 42.

**ADEQ Evaluation**

The response to RAI 47b is not adequate.

Excelsior provided the following response.

“There is no power cost to inject rinsate. Water to rinse the depleted production comes from the existing water tank at the Johnson Camp Mine. The power cost to get water to the supply water tank is included in the Water Supply Cost line item (Line 25 in Table M-1 of revised Appendix M). Rinse water for the injection wells flows by gravity from the tank at an elevation of approximately 5,200 feet amsl to the well blocks that vary in elevation from approximately 4,850 to 4,800 feet amsl. This provides a head pressure of from 150 to 170 pounds per square inch, more than adequate for rinse injection.”

Please explain how gravity flow is adequate to inject the rinsate, assuming that the injected solutions during mining would require to be injected under pressure.

**ADEQ Evaluation**

The response to RAI 47c is not adequate.

Excelsior provided the same response as that for RAI 43. Please refer to RAI 43, and RAI 16, Alternative 1, d.

**ADEQ Evaluation**

The response to RAI 47g is not adequate.

The closure costs account for Hydraulic Control Pumping for the year in question, plus three more years for rinsing. Please see comments to ADEQ Evaluation RAI 8.a.ii. and RAI 16, Alternative 1.

**ADEQ Evaluation**

The response to RAI 50 is not adequate.

Please see ADEQ's responses to RAI 8.b and RAI 16 Alternative 1, e.

Excelsior provided the following response.

“Excelsior has proposed that rinsing verification monitoring be conducted at 10% of the wellfield injection/recovery wells after the late rinsing stage (see responses to comment 43 and 47c). After numerical AWQs are achieved, the injection/recovery wells will be abandoned.”

Excelsior proposed a longer post-closure monitoring period of 5 years as opposed to the originally proposed four quarters, and provided costs for 5 annual rounds of sampling. Excelsior indicated that this was appropriate “based on the low hydraulic gradients and slow travel times observed in the project area.”

**ADEQ Evaluation**

The response to RAI 51 is **not** adequate.

Excelsior provided a revised Appendix O. Excelsior indicated that the pond floors are designed to slope. For the purpose of calculation, they chose to use the maximum depth determined at the lowest pond elevation as opposed to the average liquid depth.

The Alert Level Calculations for Leak Collection and Removal Systems provided in Appendix O is not sealed by a licensed engineer. Please provide a revised Appendix O.

**ADEQ Evaluation**

The response to RAI 53 is **not** adequate.

Excelsior indicated "Revised closure costs will be submitted by Excelsior, after review and approval by ADEQ and EPA of responses to comments 45 through 50." Based on ADEQ comments to RAI 45 through 50, submittal of revised closure and post-closure costs may be required. Additionally, please note that ADEQ will require the revised closure/post-closure costs to be submitted irrespective of EPA's approval.

**ADEQ Evaluation**

The response to RAI 54 is **not** adequate

Following approval of the closure and post-closure costs, please submit a financial demonstration, including a financial assurance mechanism, that complies with the requirements of A.A.C. R18-9-A203(B). Until such time, this item remain as a requirement.

**New Comment No. 55**

ADEQ identified errors in the cost estimation spreadsheets pertaining to the closure and post-closure costs. ADEQ provided screenshots with comments to Mr. Paul Axelrod of Axelrod, Inc. and these comments were discussed on January 13, 2017 (see attachment). Based on the comment in the screenshots and discussions with Mr. Axelrod, please provide revised cost estimation spreadsheets.

Additionally, ADEQ identified the following errors pertaining to the revised Appendix M:

- a. In the text preceding Table M-4, there appears to be a typographical error in the cost per gallon which is presented as \$0.0003442/gallon or \$298.28/Mgal. Please acknowledge the error or provide a revised page.
- b. Table M-11 has cost in linear feet for cutting and folding liner. Please explain how the cost to fold a liner is estimated based on liner feet vs. square footage.

### **Consequences of Failure to Submit Required Information**

Your response to the above listed above must be received by ADEQ on or before March 14, 2017. Failure to submit any of the above required information by the deadline will result in initiation of the denial process for this APP amendment application.

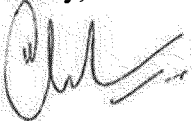
### **How to Submit**

Please submit your response to this letter using one of the following methods:

- Hard copy to:  
Arizona Department of Environmental Quality  
Attention: Vimal Chauhan, Project Manager, APP Unit, Water Permits Section  
1110 W. Washington Street, Phoenix, AZ 85007
- E-mail to:  
vc2@azdeq.gov

Thank you for your efforts to comply with Arizona's environmental requirements. Should you have any comments or questions regarding this matter, please do not hesitate to contact me at (602) 771- 4362.

Sincerely,



Vimal Chauhan, Project Manager  
APP Unit  
Groundwater Section

cc: Luke Peterson, Manager - APP Unit, ADEQ  
David Haag, Reviewing Hydrologist - APP Unit, ADEQ  
Stephen Twyerould, Ph.D., President & CEO - Excelsior Mining Corporation  
Rebecca Sawyer, VP Sustainability - Excelsior Mining Corporation  
R. Douglas Bartlett, R.G. - Clear Creek Associates  
Alison H. Jones, R.G. - Clear Creek Associates  
Nancy Rumrill, U.S. EPA